

**PROJECT REPORT  
COMMITTEE ON FOOD RESEARCH**

U.S. QUARTERMASTER FOOD AND CONTAINER INSTITUTE  
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RESEARCH AND DEVELOPMENT BRANCH  
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**SUMMARY**

Previous results have shown that rats will not grow optimally when fed the army K ration. Additions of several water soluble vitamins and casein were necessary to bring about a normal growth rate. The E ration has recently been fed to rats and the results again indicate that rats do not grow normally on this ration.

Since 1 to 2% coffee extract are contained in these rations, it was thought that perhaps this level of coffee might be producing a detrimental affect on the growth rate of rats. Therefore, the K and E rations were fed with and without coffee, and were supplemented with vitamins and with vitamins plus casein.

The results are summarized in the following table:

Group	Ration	Ave. gain/wk/rat for 6 wk. period	
		K ration	E ration
		grams	grams
I	Ration without coffee	17	20
II	Ration without coffee plus 10 B vitamins*	25	25
III	Ration without coffee plus 10 B vitamins plus 5% casein	31	35
IV	Ration with coffee	21	24
V	Ration with coffee plus 10 B vitamins	28	28
VI	Ration with coffee plus 10 B vitamins plus 5% casein	35	36

\*10 B vitamins = thiamin, riboflavin, pantothenic acid, niacin, pyridoxine, choline, inositol, p-aminobenzoic acid, biotin and folic acid in adequate amounts.

From these data it may be concluded that coffee extract in the K and E rations actually appears to be beneficial rather than detrimental to the growth of rats. This is particularly evident from a comparison of groups II and V.

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The coffee extract found in these rations was fed to rats receiving a basal corn soybean ration. No differences could be seen between groups receiving the unsupplemented and supplemented basal ration. Therefore, no explanation can be given for the stimulating effect of coffee as seen in the army rations. Growth stimulation has been attributed in other rations to the lipotropic action of the caffeine, theobromine and theophylline found in the coffee (1).

To test the possibility of a toxic factor in the bread and crackers contained in the E ration, these items were fed to two dogs as supplements to an otherwise complete basal synthetic ration. The levels fed ranged as high as 50% of the ration. These animals grew at the same rate as litter-mate control animals receiving the unsupplemented basal ration. No "running fits" nor canine hysteria were seen as a result of the bread feeding. When the coffee and chocolate found in the E ration were fed as supplements to a basal ration at a level of 2 and 3% respectively, no detrimental affect on the growth rate of dogs could be observed.

With the coffee and chocolate and the bread and crackers eliminated as possible growth depressants, attempts are now being made to determine which amino acids will give growth stimulation in the presence of vitamins, and what practical supplements might be added as sources of these missing factors.

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- (1) Heppel, Leon A., V. T. Porterfield and Evelyn G. Peake. The Lepotropic Activity of Caffeine, Theobromine and Theophylline. Archives of Biochemistry, 15, 439 (1947).